

Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

Exam style practice papers

Exercise MM1A, Question 4

Question:

A boat is to cross a river. In still water the boat would travel at 3 m s^{-1} . A current flows at a speed of 1 m s^{-1} in the river.

(a) If the velocity of the boat relative to the water is perpendicular to the bank, find the angle between the resultant velocity of the boat and the bank. (4 marks)

(b) If the resultant velocity of the boat is perpendicular to the bank, find the angle between the bank and the velocity of the boat. (4 marks)

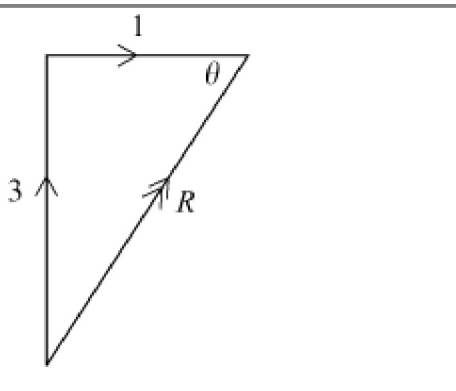
Solution:

(a) θ is the angle between the resultant velocity and the bank.

$$\tan \theta = \frac{3}{1}$$

$$\theta = 71.56$$

Angle is 71.6°

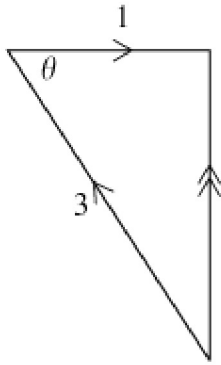


(b) In this scenario

$$\cos \theta = \frac{1}{3}$$

$$\theta = 70.52$$

\therefore Angle is 70.5°



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